



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
-----------------	-------------	----------------------	---------------------	------------------

10/531,794

04/18/2005

Jan Lindskog

P16950-US1

2309

27045

7590

12/08/2008

ERICSSON INC.  
6300 LEGACY DRIVE  
M/S EVR 1-C-11  
PLANO, TX 75024

EXAMINER

NEFF, MICHAEL R

ART UNIT

PAPER NUMBER

2611

MAIL DATE

DELIVERY MODE

12/08/2008

PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/531,794	<b>Applicant(s)</b> LINDSKOG ET AL.	
	<b>Examiner</b> MICHAEL R. NEFF	<b>Art Unit</b> 2611	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 24 October 2008.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 14, 15 and 19-23 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 14, 15 and 19-23 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)          | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)          | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____  | 6) <input type="checkbox"/> Other: _____                          |

## **DETAILED ACTION**

### ***Request for Continued Examination***

1. The request filed on 10/24/2008, for a Request for Continued Examination (RCE) under 37 CFR 1.114 based on the Parent Application No. 10/531,794 is acceptable and a RCE has been established. An action on the RCE follows.

### ***Response to Arguments***

2. Applicant's arguments with respect to claims 14, 15 and 19-23 have been considered but are moot in view of the new ground(s) of rejection.

### ***Claim Objections***

3. Claims 14, 15 and 19-23 are objected to because of the following informalities:

In claims 14 and 22, the term PAPR needs to be defined to set a meaning to the acronym.

Appropriate correction is required.

### ***Claim Rejections - 35 USC § 101***

4. 35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

5. Claims 14, 15 and 19-21 are rejected under 35 U.S.C. 101 as not falling within one of the four statutory categories of invention. While the claims recite a series of steps or acts to be performed, a statutory "process" under 35 U.S.C. 101 must (1) be

Art Unit: 2611

ties to another statutory category (such as a particular apparatus), or (2) transform underlying subject matter (such as an article or material) to a different state or thing.

The instant claims neither transform underlying subject matter nor positively tie to another statutory category that accomplishes the claimed method steps, and therefore do not qualify as a statutory process.

***Claim Rejections - 35 USC § 112***

6. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

7. Claims 14, 15 and 19-23 rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Regarding the limitations of claims 14 and 22; the claims recite the limitations of "wherein for every frame in a frame period of a first number of frames" and further "wherein a default pilot configuration is utilized for a frame in the frame period." Initially, the first number of frames is not clearly defined or disclosed when taken in the context of the previous wording which states every frame in a frame period. Further, the limitations to go on to address frame in a singular fashion after previously discloses what is/can be interpreted to read as a cumulative statement in "every frame". For these reasons the above mentioned claims are viewed as being indefinite, and require amending to correct this issue. The claims as standing are given weight to the inclusive statement of "every frame", and have such been analyzed and rejected through prior art. If the applicant is in some way trying to partition the

Art Unit: 2611

applications to the various frames within the frame period, additional language/limitations would be necessary to properly convey this and clarify the 112 issue in the claims as currently presented.

***Claim Rejections - 35 USC § 103***

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

9. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

10. **Claims 14, 21, 22 are rejected under 35 U.S.C. 103(a) as being anticipated by Kim et al. (herein after Kim) (US Publication 2002/0172184 A1) in view of Chen et al. (herein after Chen) (US Patent 4,970,714).**

Re Claim 14, Kim discloses a method of communicating consecutive frames of digital data, said method comprising the steps of:

mapping payload data into complex symbols (101-104; Paragraphs 0008-0009; Figure 2 and Paragraph 0054-0055);

Art Unit: 2611

interspersing appropriate pilot symbols (105, 106, 210, 211); and,  
mapping symbols on respective sub-channels (107, 212, 213);  
whereby the insertion of a given pilot configuration into the stream of payload data will give rise to a specific output signal being associated with a given PAPR value (219; Paragraphs 0021, 0057);

wherein the digital data comprises OFDM modulated signals comprising a first plurality of payload carrying sub-channels and a second plurality of pilot carrying sub channels (Figure 5-8; Paragraphs 0008-0010, 0042-0052 and further discussion of these embodiments);

wherein each individual frame of payload data to be transmitted over the payload channels is associated with a given unique pilot configuration chosen from a sub-set of predetermined pilot configurations, each pilot configuration forming a unique pattern of predetermined pilot symbols and transmitted (Figure 2, 209, 211, 210, 212-215; Paragraph 0056);

wherein, prior to the transmission of at least one given frame of payload data, each pilot configuration of the sub-set is evaluated with regard to PAPR for the associated frame of payload data, whereby the pilot configuration being associated with the lowest PAPR value is chosen for transmission (219, 220, Paragraphs 0057-0058); and wherein a control word indicative of the pilot configuration associated with a subsequent frame or a particular frame of a subsequent given order number is inserted into the frame and coded on a predetermined payload channel (210-217; Paragraph 0008-0010, 0021, 0054-0056); however Kim fails to explicitly disclose wherein for every

Art Unit: 2611

frame in a frame period of a first number of frames, a complete frame comprising both payload data and the control word is optimized with regard to PAPR and wherein a default pilot configuration is utilized for a frame in the frame period.

This design is however disclosed by Chen. Chen discloses wherein for every frame in a frame period of a first number of frames, a complete frame comprising both payload data and the control word (Figures 5 and 7; Col. 5 lines 29-49) is optimized (Col. 5 lines 29-49) and wherein a default pilot configuration is utilized for a frame in the frame period (Figure 7; Col. 5 lines 42-49).

Further Chen discloses the implantation of an error correction code. While Chen does not explicitly disclose that the packet is optimized with regard to PAPR, Chen does disclose the optimization of the frame. Therefore when taken in combination with the disclosure of Kim regarding the corrections based on PAPR levels, the application of the Chen reference is viewed as obvious to optimize the frames with regards to the PAPR.

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the disclosure of Chen through modification to the Kim teachings to incorporate the inclusive properties of placing both the control word and the payload data in a single frame for processing and error correction, further reducing processing time within the system.

Re Claim 21, the combined disclosures of Kim and Chen disclose the method according to claim 14, Kim further discloses wherein the sub- channels are modulated by BPSK or n-QAM modulation (Paragraph 0009).

Re Claim 22, Kim discloses a transmitter comprising:

- a mapping stage (212-215),
- mapping payload data on a subset of a plurality of frequency orthogonal sub-carriers (Paragraph 0054-0058);
- a plurality of parallel-coupled pilot insertion stages coupled to the mapping stage (210 and 211),
- each pilot insertion stage inserting a unique pilot configuration on at least another subset of sub-carriers (210-211, paragraph 0057);
- a respective inverse fast Fourier transmission stage processing signals from each respective pilot insertion stage (218);
- a PAPR measuring and pilot decision stage (219, 220),
- measuring and evaluating PAPR for each unique pilot configuration (219);
- wherein, each individual frame of payload data to be transmitted over the payload channels is associated with a given unique pilot configuration chosen from a sub-set of predetermined pilot configurations, each pilot configuration forming a unique pattern of predetermined pilot symbols, and transmitted (Figure 2, 209, 211, 210, 212-215; Paragraph 0056); and,
- wherein, prior to the transmission of at least one given frame of payload data, each pilot configuration of the sub-set is evaluated with regard to PAPR for the associated frame of payload data, whereby the pilot configuration associated with the lowest PAPR value is chosen for transmission (219, 220; Paragraphs 0057-0058) and;



said transmitter further comprising a control word insertion stage for inserting a control word in a transmitted frame, the control word being indicative of the pilot configuration used in a frame of any given subsequent order number. (210-217; Paragraph 0008-0010, 0021, 0054-0056) ; however Kim fails to explicitly disclose wherein for every frame in a frame period of a first number of frames, a complete frame comprising both payload data and the control word is optimized with regard to PAPR and wherein a default pilot configuration is utilized for a frame in the frame period.

This design is however disclosed by Chen. Chen discloses wherein for every frame in a frame period of a first number of frames, a complete frame comprising both payload data and the control word (Figures 5 and 7; Col. 5 lines 29-49) is optimized (Col. 5 lines 29-49) and wherein a default pilot configuration is utilized for a frame in the frame period (Figure 7; Col. 5 lines 42-49).

Further Chen discloses the implantation of an error correction code. While Chen does not explicitly disclose that the packet is optimized with regard to PAPR, Chen does disclose the optimization of the frame. Therefore when taken in combination with the disclosure of Kim regarding the corrections based on PAPR levels, the application of the Chen reference is viewed as obvious to optimize the frames with regards to the PAPR.

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the disclosure of Chen through modification to the Kim teachings to incorporate the inclusive properties of placing both the control word and the payload data in a single frame for processing and error correction, further reducing processing time within the system.

**11. Claim 19 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kim in view of Chen as applied to claim 14 above.**

Re Claim 19, the combined disclosure of Kim and Chen disclose the method according to claim 14, but fails to explicitly disclose wherein, the sub-carriers carrying the pilot signals are digitally modulated at a lower order (BPSK) than sub-carriers carrying the payload data (QAM).

However Kim does disclose the knowledge to use both modulation forms (BPSK and QAM) within the disclosed communication system. The Examiner reads this as disclosing the ability to apply the different modulation schemes to the various aspects of the transmitted signal, provided that the appropriate demodulation methods are prepared (Paragraph 0009 and 0057).

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to utilize the modulation techniques disclosed by Kim and Chen in a manner that allows for aspects of the transmission signal to be modulated in different modulation schemes in order to gain the benefit of utilizing the most efficient bit to symbol ratio for the system.

Art Unit: 2611

**12. Claim 15 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kim and Chen as applied to claim 14 and further in view of Stevenson (US Patent 6,209,112 B1).**

Re Claim 15, the combined disclosure of Kim and Chen disclose the method according to claim 14, Kim further discloses the use of Reed-Solomon encoding which is a well known method of block coding for the purpose of error correction to one of ordinary skill in the art, however Kim fails to explicitly disclose wherein the plurality of pilot configurations represent block codes allowing error correction at the receiver.

This method is however disclosed by Stevenson. Stevenson discloses a communication system wherein the pilot configurations represent block codes allowing error correction at the receiver (Col. 4 lines 8-21).

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the use of block coding for assistance in the process of error correction as disclosed by Stevenson with the communication method disclosed by Kim and Chen in order to gain the benefit of a reduced number of signal errors in the receiver.

**13. Claim 23 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kim and Chen as applied to claim 22 and further in view of Khandani et al. (herein after Khandani) (US Publication 2004/0093545 A1).**

Re Claim 23, the combined disclosure of Kim and Chen disclose the method according to claim 22, but fails to explicitly disclose wherein each unique pilot configuration has a hamming distance of at least three to any other pilot configuration.

This design is however disclosed by Khandani. Khandani discloses a PAPR based system wherein the block codes transmit with a hamming code value of 3 (Paragraph 0189).

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made, given that the desire to have a large hamming distance to increase the amount of error correction possible for a signal, to incorporate the disclosure of Khandani with that of Kim and Chen to gain the benefit of designing the coding to function at high rate of efficiency within a system that focuses on the signal PAPR.

**14. Claim 20 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kim, Chen and Stevenson as applied to claim 15 above and further in view of Khandani.**

Re Claim 20, the combined disclosures of Kim, Chen and Stevenson disclose the method according to claim 15, but fails to explicitly disclose wherein each unique pilot configuration has a hamming distance of at least three to any other pilot configuration.

This design is however disclosed by Khandani. Khandani discloses a PAPR based system wherein the block codes transmit with a hamming code value of 3 (Paragraph 0189).

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made, given that the desire to have a large hamming distance to increase the amount of error correction possible for a signal, to incorporate the disclosure of Khandani with that of Kim, Chen and Stevenson to gain the benefit of designing the coding to function at high rate of efficiency within a system that focuses on the signal PAPR.

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to MICHAEL R. NEFF whose telephone number is (571)270-1848. The examiner can normally be reached on Monday - Friday 8:00am - 4:30pm EST ALT Fridays.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Shuwang Liu can be reached on (571)272-3036. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Art Unit: 2611

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/MICHAEL R. NEFF/  
Examiner, Art Unit 2611  
/Shuwang Liu/  
Supervisory Patent Examiner, Art Unit 2611